

Industrial Hygiene Competency 4.6

Competency 4.6 Industrial hygiene personnel shall demonstrate a working level knowledge of emergency preparedness and response operations including personnel training, qualifications, equipment, organizational interfaces, procedures and documentation.

1. Supporting Knowledge and Skills

- a. Discuss industrial hygiene concerns/issues associated with providing emergency response operations for the following:
 - Emergency medical response
 - Toxic material emergencies (releases, spills, etc.)
 - Fire emergencies
 - Transportation accidents
 - Rescue
- b. Describe the industrial hygiene concerns/issues associated with providing personal protective equipment (PPE) and emergency equipment based on applicable exposure guides/limits (e.g., Emergency Response Planning Guidelines (ERPG), Short Term Exposure Limits (STEL), Immediately Dangerous to Life and Health (IDLH), Time Weighted Average (TWA).
- c. Discuss roles and responsibilities, lines of authority, and communication as they relate to emergency response activities both internal and external to the Department.
- d. Describe the industrial hygiene concerns/issues relating to the following procedures:
 - Decontamination
 - Confined space entry
- e. Discuss the personnel training and qualification requirements for emergency response personnel.

Industrial Hygiene Competency 4.6

2. Self-Study Activities (corresponding to the intent of the above competency)

Below are two web sites containing many of the references you may need.

| Web Sites | | |
|-------------------------------|---|--|
| Organization | Site Location | Notes |
| Department of Energy | http://wastenot.inel.gov/cted/stdguido.html | DOE Standards, Guides, and Orders |
| U.S. House of Representatives | http://law.house.gov/cfr.htm | Searchable Code of Federal Regulations |

Read the National Institute of Occupational Safety (NIOSH)/Occupational Safety and Health Administration (OSHA)/USCG/Environmental Protection Agency (EPA) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985 (DHHS NIOSH Publication No. 85-115), Chapter 12, "Site Emergencies."

EXERCISE 4.6-A Using the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, identify the rescue and response actions taken during a site emergency.

EXERCISE 4.6-B Using the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, identify the general approach to personnel decontamination during an emergency response and recovery.

Read DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*.

EXERCISE 4.6-C List two activities associated with each of the following:

- Planning
- Preparedness
- Response
- Recovery

EXERCISE 4.6-D Describe how planning and preparedness activities can help to ensure a successful emergency response.

EXERCISE 4.6-E Using DOE Order 5500.3A, name the 13 elements required for an emergency management program in DOE.

Industrial Hygiene Competency 4.6

Read DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*, Sections 9.d and e, 10.e, and 11.a and d(1) through (3).

Read the Emergency Management Guide *Standard Format and Content of Emergency Plans*, December 11, 1991.

- EXERCISE 4.6-F State the purpose of a site emergency plan.
- EXERCISE 4.6-G Identify the technical basis of the facility emergency plan.
- EXERCISE 4.6-H Using the Emergency Management Guide *Standard Format and Content of Emergency Plans*, December 11, 1991, briefly describe the major elements of a site/facility emergency plan.
- EXERCISE 4.6-I Describe the general relationship between site emergency plans and worker safety plans.
- EXERCISE 4.6-J Discuss the relationship of spill prevention plans, fire prevention and suppression plans, and the site emergency plan.
- EXERCISE 4.6-K Describe the mechanism for the interface of local, state, and tribal plans and a site emergency plan for coordinated emergency response.

Read the DOE policy and concept of emergency operations, pages 2 through 7, responsibilities of the heads of field elements, pages 22 through 27, and the definitions in Attachment 2 of DOE Order 5500.1B, *Emergency Management*.

- EXERCISE 4.6-L In the context of DOE's concept of operations for the Emergency Management System (EMS), describe the three major provisions of the EMS.
- EXERCISE 4.6-M With regard to emergency response activities, what is the primary responsibility of the head of the field element?

Read the DOE Emergency Management Guide *Interim Guidance on Offsite Response Interfaces*, pages 1 through 5.

- EXERCISE 4.6-N List examples of the emergency management (EM) support provided by off-site or external agencies/organizations to DOE facilities.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-O List examples of the EM response support provided to off-site or external agencies/organizations by DOE facilities.

Read the DOE Emergency Management Guide *Interim Guidance for Emergency Medical Support*, pages 1 through 4.

EXERCISE 4.6-P List at least three types of facilities, equipment, and supplies that on-site medical decontamination and treatment centers should maintain.

Read DOE-STD-1056-93, U.S. Department of Energy Standard, *Guide to Good Practices for Line and Training Manager Activities Related to Training*, Sections 2.7, 3.4, and 5.11, pages 6 through 8, 14 through 15, and 28 through 29.

Read DOE-STD-1070-94, U.S. Department of Energy Standard, *Guidelines for Evaluation of Nuclear Facility Training Programs*, Sections 5.3, 6.0, and 7.0, pages 9 through 16.

Read DOE-HDBK-1078-94, U.S. Department of Energy Handbook, *Training Program Handbook: A Systematic Approach to Training*, pages 53 through 63.

EXERCISE 4.6-Q Review the appendix of DOE-STD-1070-94, U.S. Department of Energy Standard, *Guidelines for Evaluation of Nuclear Facility Training Programs*.

EXERCISE 4.6-R Review Attachment 48 of DOE-HDBK-1078-94, U.S. Department of Energy Handbook *Training Program Handbook: A Systematic Approach to Training*.

Read pages 1 through 6 of the introduction to the DOE Emergency Management Guide *Emergency Operations*.

Read pages 5 through 7 of the DOE Emergency Management Guide *Protective Actions*.

Read Section 1910.120 (g)(5), Personal Protective Equipment, and Appendix C to 1910.120, Compliance Guidelines, of Subpart H, Hazardous Materials, of 29 *Code of Federal Regulations* (CFR) 1910, "Occupational Safety and Health Standards for General Industry."

EXERCISE 4.6-S Using the *Emergency Operations Management Guide*, briefly describe its contents.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-T What are Emergency Response Planning Guidelines?

EXERCISE 4.6-U What the two basic objectives of any PPE program?

EXERCISE 4.6-V What must occur if ionizing radiation (at levels greater than 2 mr/hr) is detected during a hazard cleanup activity?

Read Section 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories, of Subpart Z, Toxic and Hazardous Substances, of 29 CFR 1910, "Occupational Safety and Health Standards for General Industry."

EXERCISE 4.6-W Using 1910.1450, under what circumstances must the employer measure the employee's exposure to any regulated hazardous substance?

3. Summary

"The nature of work at hazardous waste sites makes emergencies a continual possibility, no matter how infrequently they may actually occur. Emergencies happen quickly and unexpectedly and require immediate response. At a hazardous waste site, an emergency may be as limited as a worker experiencing heat stress, or as vast as an explosion that spreads toxic fumes throughout a community. Any hazard on site can precipitate an emergency: chemicals, biologic agents, radiation or physical hazards may act alone or in concert to create explosions, fires, spills, toxic atmospheres, or other dangerous and harmful situations. Site emergencies are characterized by their potential for complexity: uncontrolled toxic chemicals may be numerous and unidentified; their effects may be synergistic. Hazards may potentiate one another -- for example, a flammable spill feeding a fire. Rescue personnel attempting to remove injured workers may themselves become victims. This variability means that advance planning, including anticipation of different emergency scenarios and thorough preparation for contingencies, is essential to protect worker and community health and safety" (NIOSH/OSHA/USCG/EPA *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985 [DHHS NIOSH Publication No. 85-115, page 12-1]).

The facility's training organization and programs should be evaluated periodically to determine whether they are achieving the established goals and objectives. The effectiveness of training programs to produce qualified personnel should also be evaluated periodically. This should be accomplished by reviewing operating occurrences, interviewing job incumbents and first-line supervisors, observing operations, etc. The results of these evaluations, if used correctly, will help ensure a facility of safe, efficient, and reliable operations.

Industrial Hygiene Competency 4.6

The following considerations should be emphasized when evaluating training and qualification programs:

- The responsibility for monitoring indicators, analyzing data, and approving revisions is clearly defined.
- The training department is alerted to facility operating, maintenance, and industrial safety experiences.
- Communication on training effectiveness occurs between plant supervisors and the training department.
- Employee opinions of the quality and effectiveness of training are collected periodically.
- The training department is alerted to employee performance errors.
- The training department meets with maintenance and operations supervisors and engineers to determine potential training problems.
- Training uses facility inspection and evaluation reports to guide program revisions.
- Facility modifications and procedure changes are monitored for training consequences.
- Training monitors industry operating and maintenance experiences for program impacts.
- Regulatory changes are reviewed for training consequences.
- Program performance data are analyzed.
- Proposed changes are reviewed by appropriate facility and training personnel.
- Training changes are tracked.

Evaluation of a technical training and qualification program activity typically includes the following criteria:

| Evaluation of a Technical Training and Qualification Program | |
|---|---|
| Criteria | Applications |
| Are the materials prepared at a level of skills and knowledge appropriate to the trainees? | Determine whether material content can be related to expected entry-level skills and knowledge, including appropriate reading level of the trainees. |
| Are the materials clearly written and presented so the trainee can complete the required learning activities? | Determine whether selected trainees can use the materials and complete the learning activities. |
| Do the materials reflect the learning objectives of the desired program? | Assess the material, comparing the learning objectives to those of the desired program, and determine which learning objectives are not covered adequately. |

Industrial Hygiene Competency 4.6

| Evaluation of a Technical Training and Qualification Program | |
|---|---|
| Criteria | Applications |
| Are the materials consistent with other materials used in the training program or the mastery of the learning objectives? | Analyze sets of materials to determine whether they are supportive and provide an effective progression of learning. |
| Do the materials conform to the learning activities of the desired program? | Analyze the materials, comparing the learning activities to those of the desired program. Identify any deficiencies. |
| Are the materials practical for use in the given facility situation? | Determine whether the materials can be used in facilities with available equipment, time, and space, and with the number of trainees planned. |

4. Exercise Solutions

EXERCISE 4.6-A Using the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, identify the rescue and response actions taken during a site emergency.

ANSWER 4.6-A Any six of the following:

- Enforce the buddy system
- Survey/locate casualties
- Assess existing and potential hazards to the on-site and off-site personnel
- Allocate resources (personnel and equipment) for rescue and incident response
- Request aid
- Control the hazard
- Extricate any victims
- Decontaminate
- Stabilize (victims, hazards, causes)
- Transport victims
- Evacuate site personnel
- Monitor the incident response and inform public safety personnel

Industrial Hygiene Competency 4.6

EXERCISE 4.6-B Using the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, identify the general approach to personnel decontamination during an emergency response and recovery.

ANSWER 4.6-B Use established procedures to decontaminate uninjured personnel in the “contamination reduction zone.” If this zone becomes unsafe, establish a new decontamination area. Decontaminate victims before and after stabilization as their medical condition indicates.

EXERCISE 4.6-C List two activities associated with each of the following:

- Planning
- Preparedness
- Response
- Recovery

ANSWER 4.6-C Any two activities from the following are acceptable.

Activities associated with planning are (1) conducting a facility hazards assessment, (2) determining the facility emergency planning zones, and (3) assessing facility/site response capabilities.

Activities associated with preparedness are (1) assigning responsibilities and authorities, (2) acquiring and maintaining resources, and (3) performing drills and exercises.

Activities associated with response are, among others, (1) categorization and notification, (2) consequences assessment and protective actions, and (3) public information.

Activities associated with recovery are (1) evaluation of damages, (2) development of a recovery plan, and (3) consequence assessment and environmental monitoring.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-D Describe how planning and preparedness activities can help to ensure a successful emergency response.

ANSWER 4.6-D Planning includes development and preparation of plans and procedures to ensure an effective emergency response. Preparedness activities ensure that plans and procedures are adequate and valid; that equipment and facilities are available for emergency response; and that personnel are trained to effectively implement the plans and procedures when responding to an emergency to protect workers, the public, and the environment.

EXERCISE 4.6-E Using DOE Order 5500.3A, name the 13 elements required for an emergency management program in DOE.

ANSWER 4.6-E The 13 elements of an emergency program include the following:

- Emergency response organization
- Off-site response interfaces
- Operational emergency event classes
- Notifications
- Consequence assessment
- Protective actions
- Medical support
- Recovery and reentry
- Public information
- Emergency facilities and equipment
- Training
- Drills and exercises
- Program administration

EXERCISE 4.6-F State the purpose of a site emergency plan.

ANSWER 4.6-F The purpose of the emergency plan is to describe the entire process designed to respond to and mitigate the potential consequences of an emergency at a DOE site.

EXERCISE 4.6-G Identify the technical basis for the facility emergency plan.

ANSWER 4.6-G The basis for the facility emergency plan is the facility hazards assessment.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-H Using the DOE Emergency Management Guide *Standard Format and Content of Emergency Plans*, December 11, 1991, briefly describe the major elements of a site/facility emergency plan.

ANSWER 4.6-H Major elements of an emergency plan include the following:

Introduction - Includes a statement of the purpose and scope of the plan, concept of operations, and a description of the site.

Emergency Response Organization - Describes the internal (on-site) emergency response organization, including a description of the organization, direction, and control, and the emergency management operations.

Off-site Response Interface - Describes emergency response available off site, including other Federal agencies and state, local, and tribal governments, and describes the memoranda of agreement, memoranda of understanding, and agreements in principle for interface with these off-site groups.

Operational Emergency Event Classes - Describes the emergency action levels, which trigger an emergency response and activate the emergency plan.

Notification and Communication - Describes necessary notifications and communication of those notifications during an emergency event.

Consequence Assessment - Describes the determination and calculation of potential consequences.

Protective Actions - Describes emergency planning zones, Protective Action Guides and Emergency Response Planning Guidelines, personnel accountability and communication during an emergency event, and termination and/or shutdown.

Medical Support - Provides information on facilities, equipment, and staff available for medical support to an emergency. This section also describes any agreements for transportation and treatment of the injured by off-site agencies.

Industrial Hygiene Competency 4.6

Recovery and Reentry - Discusses the termination or downgrade of the emergency, as well as actions necessary for reentry and recovery.

Public Information - Describes facilities, equipment, and mechanisms for coordination of emergency public information.

Emergency Facilities and Equipment - Describes facilities and equipment available for emergency response.

Training - Describes training requirements and available training for on-site and off-site personnel.

Drills and Exercises - Describes the objectives and schedule for drills and exercises for on-site personnel and coordination with off-site agencies.

Emergency Management Program Administration - Identifies the emergency management program administrator, as well as administrative controls for self-assessment.

EXERCISE 4.6-I Describe the general relationship between site emergency plans and worker safety plans.

ANSWER 4.6-I Site emergency plans should be coordinated with worker safety plans to ensure that worker safety is not compromised during any emergency response.

EXERCISE 4.6-J Discuss the relationship of spill prevention plans, fire prevention and suppression plans, and the site emergency plan.

ANSWER 4.6-J Spill prevention plans and fire prevention and suppression plans should be reflected in the facility emergency plan.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-K Describe the mechanism for the interface of local, state, and tribal plans and a site emergency plan for coordinated response to an emergency.

ANSWER 4.6-K Memoranda of understanding or agreements in principle provide the mechanism for interface of local, state, and tribal emergency plans with DOE site emergency plans. These are formal agreements and should be included in the off-site interface section of the site emergency plan.

EXERCISE 4.6-L In the context of DOE's concept of operations for the EMS, describe the three major provisions of the EMS.

ANSWER 4.6-L

1. The development, coordination, etc., of emergency plans and procedures
2. Ensuring the readiness of all DOE capabilities in responding to operational, energy, and continuity of government (COG) emergencies
3. The management, coordination, and direction of responses to emergencies

EXERCISE 4.6-M With regard to emergency response activities, what is the primary responsibility of the head of the field element?

ANSWER 4.6-M To establish and maintain an effective, integrated emergency preparedness program.

EXERCISE 4.6-N List examples of the EM support services provided by off-site or external agencies/organizations to DOE facilities.

ANSWER 4.6-N Hospitals, fire departments, ambulances, and coroners.

EXERCISE 4.6-O List examples of the EM response support provided to off-site or external agencies/organizations by DOE facilities.

ANSWER 4.6-O Radiological incident assistance, monitoring, detection, and assessment; medical support and advice to hospitals treating radiologically contaminated persons.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-P List at least three types of facilities, equipment, and supplies that on-site medical decontamination and treatment centers should maintain.

ANSWER 4.6-P Any three of the following:

1. Designated contaminated personnel entrance
2. Contamination removal area
3. Showers with used water collection ability
4. Radiation survey instruments and decontamination supplies
5. Separate showers and change rooms for medical and health physics personnel
6. Chelation therapy treatment capability
7. Chemical burn treatments and antidotes

EXERCISE 4.6-Q Review the appendix of DOE-STD-1070-94, U.S. Department of Energy Standard, *Guidelines for Evaluation of Nuclear Facility Training Programs*.

ANSWER 4.6-Q None required.

EXERCISE 4.6-R Review Attachment 48 of DOE-HDBK-1078-94, U.S. Department of Energy Handbook, *Training Program Handbook: A Systematic Approach to Training*.

ANSWER 4.6-R None required.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-S Using the *Emergency Operations Management Guide*, briefly describe its contents.

ANSWER 4.6-S

| Guidance Documents Found in the <i>Emergency Operations Management Guide</i> | |
|--|--|
| Guide | Content |
| Program Administration | Overall establishment and maintenance of the emergency management program and management responsibilities. |
| Standard Format and Content of Emergency Plans | Describes the standard format that should be used when developing emergency plans and discusses the details of the emergency management program elements, identified in DOE Order 5500.3A, that should be included in emergency plans. |
| Emergency Response Organization | Describes the organizational element with clearly specified authorities and responsibilities for emergency response and mitigation that should be established and maintained for each facility/site. |
| Offsite Response Interfaces | Describes the provisions that should be in place for interface and coordination with Federal, state, tribal, and local agencies and organizations responsible for off-site emergency response and for protection of the environment and health and safety of the public. |
| Notification | Describes the notification and communication of emergency information, which should be consistent with the requirements of DOE Orders 5000.3A and 5500.2B. |
| Medical Support | Describes the provisions that should be in place for medical support for workers, including those with radiological and/or hazardous material contamination. |
| Public Information | Describes an emergency public information program, consistent with DOE Order 5500.4A, which should be established and integrated into the emergency management program. |
| Emergency Facilities and Equipment | Describes the facilities, equipment, and supplies that should be established and maintained for adequate emergency response support. |

Industrial Hygiene Competency 4.6

| Guidance Documents Found in the <i>Emergency Operations Management Guide</i> | |
|--|--|
| Guide | Content |
| Hazards Assessment | Covers the preparation and use of the hazards assessment, which is critical to any full-spectrum emergency management program, as well as a discussion of the development of emergency planning zones (EPZs). |
| Operational Emergency Event Classes | Describes the process by which operational emergencies involving or affecting DOE facilities are characterized as one of the operational emergency classes (e.g., Alert, Site Area Emergency, or General Emergency) in accordance with DOE Order 5500.2B. It also describes the emergency action levels (EALs), the specific criteria used to recognize and categorize events, which should be developed for the spectrum of potential operational emergencies identified by the hazards assessment. |
| Consequence Assessment | Describes the provisions that should be in place to adequately assess the actual or potential on-site and off-site consequences of an emergency. |
| Protective Actions | Describes the provisions that should be in place for specific, predetermined actions to be taken in response to emergency conditions to protect on-site personnel and the public. |
| Recovery and Reentry | Describes the provisions that should be made for recovery from an operational emergency and reentry into the affected area. |
| Drills and Exercises | Describes the coordinated program of drills and exercises that should be an integral part of the emergency management program. |
| Training | Describes the general training that should be provided to all workers regarding operational emergencies, and specialized training that should be conducted for all workers and be available to all regional, Federal, state, tribal, and local emergency response organizations. |
| Emergency Readiness Assurance Plan (ERAP) | Discusses the five-year plans that are developed to ensure that emergency plans, implementing procedures, and resources are adequate and sufficiently maintained, exercised, and evaluated. |

Industrial Hygiene Competency 4.6

| Guidance Documents Found in the <i>Emergency Operations Management Guide</i> | |
|--|---|
| Guide | Content |
| Appraisal Criteria | Discusses the program used to ensure that stated emergency capabilities are sufficient to implement emergency plans, and that timely improvements are made in response to needs identified through coordinated emergency planning, resource allocation, training, drills, exercises, and evaluations. |
| Emergency Exercise Evaluation Criteria | Contains the standards and criteria used by the Director of Emergency Operations (DEO) using oversight appraisals of emergency exercises conducted by DOE sites and facilities. |
| Emergency Readiness Deployment Evaluations (ERDEs) | Contains the standards and criteria used by the Deputy Assistant Secretary for Military Applications (DASMA) and the DEO during evaluations of the ability of DOE national response assets to deploy to an incident site and carry out the responsibilities of the asset. |

EXERCISE 4.6-T What are Emergency Response Planning Guidelines?

ANSWER 4.6-T Emergency Response Planning Guidelines (ERPGs) are developed and approved by the American Industrial Hygiene Association (AIHA) and are used for comparison with exposures resulting from nonradiological releases to determine the appropriate emergency class.

EXERCISE 4.6-U What the two basic objectives of any PPE program?

ANSWER 4.6-U To protect the wearer from safety and health hazards, and to prevent injury to the wearer from incorrect use or malfunction of the PPE.

EXERCISE 4.6-V What must occur if ionizing radiation (at levels greater than 2 mr/hr) is detected during a hazard cleanup activity?

ANSWER 4.6-V All site activities should cease until the site has been assessed by health physicists.

Industrial Hygiene Competency 4.6

EXERCISE 4.6-W Using 1910.1450, under what circumstances must the employer measure the employee's exposure to any regulated hazardous substance?

ANSWER 4.6-W If there is reason to believe that exposure limits for that substance routinely exceed the action level (or in the absence of an action level, the Permissible Exposure Limit).